AMENDMENTS TO THE CLAIMS

1. (Original) In an integrated circuit wireless communication device, a method for Viterbi decoding comprising:

receiving a transmitted signal over a channel substantially characterized by a scalar gain value and a noise value;

processing the gain value and noise value to determine a branch metric by determining a log of the scalar gain value and subtracting therefrom a log of the noise value and subtracting therefrom the log of a first constant to form a first sum, and determining an antilog of the first sum and subtracting therefrom a second constant to form a second sum, the second sum corresponding to the branch metric; and

providing the branch metric to a Viterbi decoder.

2. (Original) The method of claim 1, wherein the processing of the gain value and noise value to determine a branch metric scaling further comprises adding a log of a location information scaling factor to the first sum.

3. (Original) The method of claim 1, wherein the processing of the gain value and noise value to determine a branch metric further comprises rounding out any fractional bits in the second sum.

4. (Original) The method of claim 1, wherein the processing of the gain value and noise value to determine a branch metric further comprises saturating the second sum.

5. (Currently Amended) The method of claim 1, wherein the processing of the gain value and noise value to determine a branch metric further comprises using a processor to calculate a branch metric (M) using the equation $M = \left\lceil \frac{1}{C_1} \frac{|H|^2 k_{loc}^2}{\sigma^2} - C_2 \right\rceil$,

where H is the scalar gain value, C_1 is the first constant for a transmit constellation, C_2 is the second constant for a transmit constellation, k_{loc} is a location information scaling

factor, and σ^2 is the noise value.

6. (Original) The method of claim 1, wherein the log of the scalar gain value is determined by:

determining a lower integer boundary L for the scalar gain value which is a bit position of a most significant "1" in a binary representation of the scalar gain value;

interpolating an interpolated value between L and L+1 using a lookup table indexed by P next most significant bits of the scalar gain value; and

concatenating the lower integer boundary L and the interpolated value to form the log of the scalar gain value.

7. (Original) The method of claim 6, wherein the determination of a lower integer boundary L comprises left shifting the scalar gain value a required number of shifts until an N-1 bit position contains a one value, and then subtracting the required number of shifts from the N-1 value.

8. (Original) The method of claim 1, wherein the log of the noise value is determined by:

determining a first value which is a bit position of the most significant "1" in an N-bit binary representation of the noise value;

determining a second value by interpolating between the first value and the first value plus one using a lookup table; and

concatenating the first value and the second value as a most significant bits portion and least significant bits portion, respectively, to form the log of the noise value.

9. (Original) The method of claim 1, wherein the antilog of the first sum is determined by:

right shifting the first sum by R bits to generate a left shift control signal; and

using the R least significant bits of the first sum as an index into a lookup table to generate an intermediate value which is left shifted under control of the left shift control signal to generate the antilog of the first sum.

10. (Original) The method of claim 1, wherein the processing of the gain value and noise value are performed by a PHY module in a wireless interface device.

11. (Canceled)

12. (Currently Amended) ~~The article of manufacture of claim 11~~ An article of manufacture having at least one recordable medium having stored thereon executable instructions and data which, when executed by at least one processing device, cause the at least one processing device to compute a branch metric for a Viterbi decoder, comprising implementing a multiplication operation of a first term and a second term in the branch metric computation by:

adding a log of the first term to a log of the second term to form a first sum; and

determining the antilog of the first sum, wherein the processing device computes a branch metric for a Viterbi decoder by

computing a $\log_2|H|^2$ value, where H represents a scalar gain value for a transmission channel;

subtracting a $\log_2\sigma^2$ value from the $\log_2|H|^2$ value to form a first sum, where σ^2 represents ~~the~~ a noise variance value for the transmission channel;

subtracting a $\log_2 C_1$ value from the first sum to form a second sum, where the C_1 value has been pre-computed and stored in memory;

computing an antilog of the second sum; and

subtracting a C_2 value which has been stored in memory from the antilog of the second sum to form a branch metric.

13. (Original) The article of manufacture of claim 12, wherein processing device rounds out any fractional bits in the branch metric and saturates the branch metric to a predetermined range.

14-16. (Canceled)

17. (Currently Amended) ~~The apparatus of claim 14,~~ An apparatus for decoding a signal, the apparatus comprising:

means for receiving a sampled signal;

means for demapping the received sampled signal into a branch metric comprising means for performing multiplication operations in a log domain using an adder circuit and means for performing division operations in a log domain using an subtractor circuit; and

means for providing the branch metric a Viterbi decoder, where the means for demapping comprises a means for calculating a branch metric (M) using the equation $M = \left[\frac{1}{C_1} \frac{|H|^2 k_{loc}^2}{\sigma^2} - C_2 \right]$, where H represents a scalar gain value for a transmission channel, C_1 is a first pre-computed constant for a transmit constellation, C_2 is a second pre-computed constant for a transmit constellation, k_{loc} is a location information scaling factor, and σ^2 represents a noise variance value for the transmission channel.

18. (Currently Amended) The apparatus of claim 17 ~~14~~, where the means for demapping comprises a means for calculating a branch metric (M) using the equation $M = \left[\frac{1}{C_1} \frac{|H|^2}{\sigma^2} - C_2 \right]$, where H represents a scalar gain value for a transmission channel, C_1 is a first pre-computed constant for a transmit constellation, C_2 is a second pre-computed constant for a transmit constellation, and σ^2 represents a noise variance value for the transmission channel.

19. (Currently Amended) The apparatus of claim 17 ~~14~~, where the means for demapping comprises

an input for accepting a first value representing the scalar gain for a transmission channel;

a log unit that accepts the first value from the input and determines a log of the first value;

a first subtractor for subtracting a log of a second value from the log of the first value to form a first difference, said second value representing a measure of additive white Gaussian noise for a channel over which the sampled signal was transmitted;

a second subtractor for subtracting a log of a first constant from the first difference to form a second difference;

a first adder for adding a log of a location information scaling factor (k_{loc}) to the second difference to form a first sum;

an antilog unit that accepts the first sum and determines an antilog of the first sum;

a second adder for adding the antilog of the first sum to a second constant to a preliminary branch metric, where the second constant comprises an offset that is a function of a transmit constellation for the transmit channel; and

a saturation unit for saturating the preliminary branch metric to generate the branch metric.

20. (Original) The apparatus of claim 19, wherein the first subtractor and second subtractor are implemented as a single circuit.